

Description of Code/Data

This document describes the code and data that can be used to replicate the result in Beaudry, Galizia and Portier, “Putting the Cycle Back into Business Cycle Analysis”. The contents are:

- Folder **RecessionProbabilities**: For generating recession probability figures and hypothesis tests in Section 1.
 - Files to run:
 - ◆ **RegrRecProbCI.m**: MATLAB script used to get point estimates and confidence intervals for the recession probabilities in Section 1 and Online Appendix B.
 - ◆ **RegrRecProbChisq.m**: MATLAB script to conduct recession probability hypothesis tests in Online Appendix B.
 - Functions:
 - ◆ **fnRegr.m**: MATLAB function to run regressions and obtain Newey-West-based confidence intervals.
 - ◆ **rcindCreate.m**: MATLAB function to create 0-1 recession indicators from series of recession/expansion lengths.
 - ◆ **NewWest.m**: MATLAB function to obtain Newey-West covariance matrix estimate.
 - ◆ **fnRegrChisq.m**: MATLAB function to get covariance matrix across recession probability horizons (k).
 - ◆ **simrcind.m**: MATLAB function for bootstrapping recession/expansion histories.
 - Data:
 - ◆ **recdates.mat**: MATLAB data file containing NBER peak dates (variable **pkdt**) and trough dates (variable **trdt**) for the US business cycle.
- Folder **SpectralDensityPlot**: For the various spectral density plots of the data in Section 1.
 - Files to run:

- ◆ `SpecPlot.m`: MATLAB script used to plot smoothed spectra of data in levels, along with spectra of various high-pass-filtered versions.
 - ◆ `SpecCI.m`: MATLAB script used to plot smoothed spectra along with bootstrapped confidence intervals.
 - Functions:
 - ◆ `simSpecCI.m`: MATLAB function to bootstrap smoothed spectra.
 - ◆ `rgb.m`: MATLAB function used for plotting colors.¹
 - ◆ `bpfilter.m`: MATLAB file to do Christiano & Fitzgerald (1999) band-pass filtering.²
 - Data:
 - ◆ `Data.mat`: MATLAB data file containing the data series used in the paper (see below for full description of this file).
- Folder `PeakTests`: For conducting the hypothesis tests in Table 1.
 - Files to run:
 - ◆ `PeakTest.m`: MATLAB script to conduct hypothesis tests for the presence of a peak.
 - Data:
 - ◆ `Data.mat`: MATLAB data file containing the data series used in the paper (see below for full description of this file).
- Folder `Figure 4`: To produce Figure 4.
 - Files to run:
 - ◆ `Figure4.m`: MATLAB function to produce figure.
 - Functions:
 - ◆ `RBC.mod` (basic RBC model), `RBC2.mod` (extended RBC model), `CMR.mod` (Christiano, Motto and Rostagno (2014)), `SW.mod` (Smets and Wouters (2007)), `CF.mod` (Carlstrom and Fuerst (1997)), `BGG.mod` (Bernanke, Gertler and Gilchrist (1999)): Dynare `.mod` files.
 - ◆ `DatSpec.m`: MATLAB file to do spectrum estimation and smoothing.
- Folder `NKModel1`: For the New Keynesian model in Section 3.
 - Files to run:

¹Written by Kristján Jónasson.

²Written by Christiano & Fitzgerald.

- ◆ MFNK_Est.m: MATLAB file to get all results for the New Keynesian model.
- ◆ Buildmex.m: MATLAB file to re-generate the MATLAB MEX file (from C++ code; see below) used in simulating the model.
- Functions:
 - ◆ MFNK_Est_fn.m: MATLAB function to compute objective function for estimation.
 - ◆ MFNK_Est_FrmData.m: MATLAB function that runs estimation algorithm.
 - ◆ MFNK_Est_prtr.m: MATLAB function that does some parameter transformations.
 - ◆ MFNK_Est_SimMom.m: MATLAB function that gets moments from simulated data.
 - ◆ TaylExp.m: MATLAB function that determines the exponents for each monomial in a multivariate Taylor expansion.
 - ◆ NKRF_SlvMod_Full.m: MATLAB function to solve the model.
 - ◆ NKRF_Sim_fn_mex.mexw64: MATLAB MEX function, which is the compiled version of NKRF_Sim_fn_mex.cpp (compiled using Buildmex.m).
 - ◆ DervF11_ord2_fn.m, DervF11_ord3_fn.m: MATLAB functions to sequentially obtain 2nd- and 3rd-order derivatives of solution function.
 - ◆ NKRF_Derivs_Full.m: MATLAB function that re-computes DervF11_ord2_fn.m and DervF11_ord3_fn.m.
 - ◆ NKRF_Sim_fn_mex.cpp: C++ script to simulate the model.
 - ◆ rgb.m: MATLAB function used for plotting colors.³
 - ◆ bpfiler.m: MATLAB file to do Christiano & Fitzgerald (1999) band-pass filtering.⁴
- Data:
 - ◆ EstimationData.mat: MATLAB data file containing the data used in estimation.
 - ◆ EstShkSd.mat: MATLAB data file containing the seed for the random number generator used in the results reported in the paper (for replicability).
 - ◆ Params_*.mat: Several MATLAB data files containing the parameters estimated for the different cases in the paper. The * is one of:
 - ◇ x_y: Non-Linear RP model estimated over the x-y-quarter range.
 - ◇ 2_50_LinRP: Linear RP model estimated over the 2-50-quarter range.

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- ◊ `2_50_NoFriction`: No Friction model estimated over the 2-50-quarter range.
- ◊ `2_50_Canon`: Canonical model estimated over the 2-50-quarter range.
- ◆ `ses_*.mat`: Several MATLAB data files containing the standard errors for the cases shown in Table 2. The naming convention is the same as the parameter files.

The Data file (`Data.mat`)

The file `Data.mat` is a MATLAB file containing all time series data used in the paper. The file contains a single struct variable called `Data`. Each field of `Data` is another struct variable corresponding to a different data series. These are as follows:

- `.1hnbBLS`: Our main hours series, non-farm business hours worked per capita (Figure 1).
- `.EmPop`: Employment rate (Figure 2(a)).
- `.u`: Post-war unemployment rate (Figure 2(b)).
- `.uRZ`: Long sample unemployment rate from Raimey-Zubairy (Figure 2(c)).
- `.IYrat`: Investment/GDP ratio (Figure 2(d)).
- `.BaaFFSpr`: BAA/FF interest rate spread (Figure 5(a)).
- `.NFCI`: Chicago Fed National Financial Conditions Index (Figure 5(b)).
- `.AaaTb11Spr`: AAA/T-bill interest rate spread (Figure 5(c)).
- `.ShillerPER`: Shiller price/earnings ratio (Figure 5(d)).
- `.u_UK`, `.u_Ger`, `.u_Fra`, `.u_Jap`, `.u_Can`, `.u_Ita`: Unemployment rates for, respectively, the U.K., Germany, France, Japan, Canada, and Italy (Online Appendix Table D.1).

The fields of each series' struct variable are as follows:

- `.data`: Vector of actual data.
- `.LongName`: Longer description of data series.
- `.fdat`: First quarter of data available for the series.
- `.ldat`: Last quarter of data available for the series.
- `.m100`: A flag equal to 1 if the data should be multiplied by 100 to convert from fractions/logs to percentages.